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ABSTRACT

Research progress by member institutions is reviewed with regard to university administration, computing, committees, libraries, and student welfare. Consideration is given to effectiveness and efficiency, management information, management by objectives, periodic review of objectives, strategy, and analytic resource allocation. Two research projects are described: (1) the University of Leeds project concerning student flow prediction, administration, committees, and computing; and (2) Huddersfield Polytechnic's on libraries and student welfare. A bibliography is included on DES project papers. (LBH)

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PROGRAMME ON INSTITUTIONAL MANAGEMENT IN HIGHER EDUCATION

IDENTIFICATION OF PERFORMANCE INDICES FOR CENTRAL SERVICE ACTIVITIES

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OECD ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

ORGANISATION FOR ECONOMIC
CO-OPERATION AND DEVELOPMENT

Centre for Educational Research
and Innovation

Paris, 16th December 1974
Or. Engl.

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Programme on Institutional Management in Higher Education

University and Polytechnic objectives, resource allocation and performance indices in the Central Services

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Professor Kenneth Smith

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10092

Second General Conference of Member Institutions
Paris 20-22nd January, 1975.

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NOTE BY THE SECRETARIAT

At any given point in time, the research groups of OECD's Programme on Institutional Management in Higher Education are in varying stages of advancement, since each has its own predetermined starting date and duration. On the occasion of the programme's Second General Conference of Member Institutions, final reports on the findings of three research groups which completed their work during 1974 are being presented. In addition, however, the Conference provides an opportunity for representatives of all the Member institutions to become acquainted with investigations in progress by other research groups participating in the programme. Thus, invitations have been extended to five on-going groups to present progress reports at the Conference. The topics included are :

- Identification of indices of performance for teaching activities;
- Identification of indices of performance for service activities;
- The use of cost-effectiveness and cost-benefit techniques in planning courses of study for new higher educational institutions;
- The costing and management of university grants and contracts; and
- Economic and pedagogical aspects for managing new communication technologies in higher education.

Of the above listed topics, the first three are the subject of full-scale investigations to be carried out over a two-year time span. By contrast, feasibility studies of a relatively limited scope have been carried out in the case of each of the last two topics and it is expected that these feasibility studies will lead to the formulation and implementation of full-scale projects in a second stage.

The purpose of the Central services is to assist the Teaching and Research missions according to the priority of the institution's aims. This project is investigating the relationship between institutional objectives, performance criteria and subsequent resource allocation for the central services of:

1. administration
2. computing
3. committees
4. library
5. student welfare

for the U.K. universities and polytechnics. The decision-making processes involved, with the operational implications, are being considered.

Central Services are unique in university management allocations in that, in general, they by-pass any competitive

vetting procedure, as exists between academic departments for the allocation of new resources of all categories. The various discipline profiles of the universities with the differing factors of sophistication of usage, satisfaction of quantity and quality of provision, makes inter-institutional comparisons difficult. To be useful, comparisons must not only show how one Central Service compares with others, but to try and show why differences occur. Crude comparisons derived only from published data would provide poor, if not misleading indicators of performance.

The Centre for Educational Research and Innovation wishes to express its sincerest thanks to the members of the U.K. research group for providing us with the attached report on the progress being made on this project, which will continue during 1975.

1. INTRODUCTION

1.1. Effectiveness and Efficiency

These two terms are often erroneously used interchangably. Failure to distinguish between them goes far beyond mere niceties of language usage; it can lead to misdirected effort and inappropriate attention. Effectiveness is "doing the right thing" while efficiency is "doing the thing right". This project is about effectiveness.

It is not implied that efficiency is not an important concern; it is. It is a necessary but not sufficient condition for success.

1.2 Management Information

In the intensifying competition for state financial support, universities are being increasing required to provide relevant information for evaluation of their effectiveness.

Universities have been reasonably well attuned to the requirement of measuring their inputs or needs, but are far less accustomed to the corresponding requirement of measuring their outputs. Generally, university accounting systems are oriented primarily to accounting for funds received and spent, rather than to supplying meaningful information on outputs for managerial purposes.

There must be recognition of the importance of management information and analysis to improve the effective allocation of the university's scarce resources so as to produce maximum benefits to the organisation as a whole.

1.3 Management by Objectives

In universities and polytechnics central services are often treated as a 'free good'. Marginal allocation of facilities, instead of a total-allocation revue in respect to the changing institutional priorities towards various goals, appears to be a standard practice.

In analysing objectives for the central

1. administrative
2. computing
3. committee
4. library
5. student welfare

services we found that their objectives are not sufficiently explicit to be of direct assistance to the management of planning and decision making.

Often, the objectives are in conflict. Objectives calling for different aspects of better service are in conflict among themselves for scarce funds and against objectives calling for lower costs. Organisation units following conflicting objectives tend to act in competition with each other rather than in co-operation towards a common purpose.

Fielden and Lockwood have stressed the importance of planning resource allocations; but procedures to elicit and quantify as far as possible objectives and performance criteria, that reflect the success of the central service resource allocation in reaching university objectives, have not been developed.

1. 'Planning and Management in Universities' [Chatto and Windus 1973]

A frame of reference is needed, in which the university and polytechnic is seen as having purposes beyond the level of the sum of the goals of factions, departments or disciplines. It is vitally important that resource allocating strategies reflect known and agreed institutional objectives for performance.

We feel the objectives of a university can be stated in terms of the functions it performs to society in the areas of teaching and research. Since the university central services only exist to assist the academic functions, objectives for the central services should be in terms of the needs and requirements of the teaching and research efforts of the university concerned. It may prove more effective if some central services are decentralised to the academic functions. The Central Administrative Service, in particular, often appears to receive resources without sufficient academic vetting according to institution-wide aims as to exactly how teaching or research is being enhanced by the expenditure of such resources.

1.4. Periodic Review of Objectives

If institutions of higher education wish to maintain their current share of the country's social service budgets, then their programs must necessarily adapt to developments in technology and knowledge, by periodically reviewing the relevance of it's present sets of objectives and their ratings to the needs of the society in which it is embedded. Compoundir the need for periodic review is the shortage of funds, the growing cost of staff and equipment, while demand for central

service resource increases.

Change almost invariably distrubs the power equilibrium in an organisation by calling objectives and their weightings into question, unsettling present formulae for distributing resources and shaking the status structure.

To manage change and produce effective central service resource allocations, project objectives and rankings must become more explicit. Explicit consideration of objectives not only assists the selection of projects on a rational basis to produce a high performance portfolio but exposes to review the critical factors in decision making.

The separate sets of project objectives and weightings will need to become orientated, if not compatible, with the spectrum of institution-wide objectives. The establishment of institution-wide objectives must be done by the university academics and periodically reviewed.

1.5. Two Strategies

The clarification of values by explicit statements of objectives makes conflict in the university equally explicit. Conflict strategies have been categorised into:

a) Analytic which assume that a common set of objectives can be found and that disagreement over sub-objectives and weightings can be mediated by reference to common objectives.

b) Bargaining which assumes that disagreement over objectives and their weightings cannot be reconciled, yet co-operation is required because of the cost saving with shared resources.

If changes in the university environment creates a great disparity in objectives, without requiring a split in the shared resource, a bargaining, political perspective is appropriate. For bargaining to be fair and agreeable to the parties involved, decisions must be reached using information on the degree allotments satisfy their sets of objectives. Dispute from a bargaining process is often over the relative satisfaction received, than directly about the size of an allocation.

Bargaining is particularly prone to irrational behaviour. Quantitative data on goal satisfaction focuses attention on relevant factors in a manner which exposes irrational requests.

1.6. Analytic Resource Allocation

The university receives funds from the State, which it then allocates to teaching, research and central service functions to produce.

a) educated people
b) new knowledge and scholarship
c) new inventions etc.

that contribute to society.

What contributes 'education' and 'contributing to society' is open to debate, and requires informed debate.

The use of quantitative performance measures associated with these objectives can provide information to assist analytic and bargaining strategies for resource allocation.

The academic functions and central services must jointly contribute to these prime objectives. Allocation of funds between these two, and then the internal allotment of facilities to the respective users must not be to the advantage of particular missions, unless they can then contribute adequately to the university as a whole. It is vital for a university to have a coherent plan for developments. A steering committee on planning is a necessity.

Many universities use a bargaining strategy in central service resource allocation, when if objectives were made explicit and clarified by open discussion, an analytic strategy would very likely emerge. The lack of information on the implications of resource allocation decisions makes existing bargaining strategies, in particular, open to error. Management information using quantitative data

1. helps to focus attention,
2. makes explicit relevant factors,

to assist effective decision making.

---

2. SUMMARY OF CURRENT RESEARCH

2.1. STUDENT PREDICTION

In whatever way resources are allocated to meet objectives they must attempt to take into account future changes. An important variable to be considered is the expected number of students. A computerized student prediction model has been built and tested, that attempts to forecast trends in student numbers. The model accepts parameters, based on administrators judgement to improve the accuracy of the calculations.

Data Sources

The forecasting accuracy of any model depends upon the accuracy and relevance of the data upon which it operates. The main data source is from the University Registration File, containing information on all currently registered students. This file is split into six main divisions:

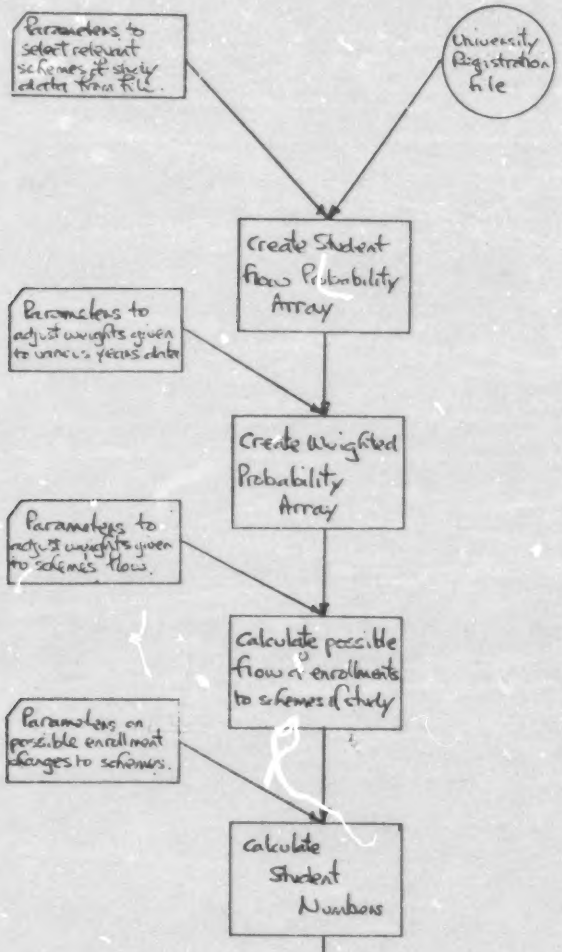
1. Student identification
2. Personal information
3. Previous education and qualifications
4. Leavers details
5. Admission data
6. Current years information.

The important point about this data is that for each student on the file, data is given for both the current and previous year of Scheme of Study and Year of Study.

Data from more recent years is likely to reflect

future trends more accurately, and a weighted average of three years data is used by the model.

Simplified flowchart.


Parameters to select relevant schemes of study extract from file.
University Registration file
Create Student flow Probability Array
Parameters to adjust weights given to various years data
Create Weighted Probability Array
Parameters to adjust weights given to schemes flow.
Calculate possible flow of enrollments to schemes of study
Parameters on possible enrollment changes to schemes.
Calculate Student Numbers
Student Numbers listing by faculty & Scheme of study.

Basic Predictive Model

The model is based on Markov Networks, weighted historical data and parameters based on administrators judgement, to cater for all undergraduate three to six year schemes of study. This covers students within the faculties of Science, Arts, Applied Science, Economics, Law and Medicine.

Expected changes in enrollment can be calculated either on a Faculty basis or on individual Schemes of Study. However, transfers between faculties are not catered for, but the number of such transfers is very limited.

Future Work

The student flow model is only the first part of a two part project. The second stage is examining Staff Development by analysing previous data and predicting into the future. This will provide predictions to assist the planning of future resource allocations.

The program is being ammended to also calculate full-time-equivalent student numbers. As courses became more modular in design, the calculation of FTE student numbers is more appropriate than student numbers.

2.2. ADMINISTRATION

Admin. Costs are Overheads

The objectives of a university or polytechnic are to improve the quality and quantity of its outputs from the teaching and research programs. All administration costs are overheads.

It is not only necessary to keep the costs of admin. tasks to a minimum but also to see if those tasks are really necessary.

The costs of centralising or decentralising various admin. functions needs to be examined. Also the costing of the quality of service provided must be compared with the benefits of that funding being spent elsewhere.

Types of resource

Broadly speaking there are three types of resource with which we are concerned: staff, equipment and recurrent funds. A breakdown of the expenditure of the Administration invariably shows staff salaries as the major part of their expenditure.

Hidden resources

Many tasks of the administrative function are carried out by academics and secretarial staff in the Academic departments. It is necessary but difficult to collect data on this "hidden" resource for implementing the institution's administrative functions.

Difficulties in classifying cost centres

When examining Statements of Accounts there are also difficulties in deciding what cost categories are associated with the function of Central Administration. The staff who maintain the premises of the institution are generally recommended for employment by officers within the Administration. So to get a fairly realistic picture of the resources under the control of the Administration, we have taken into account not just the entry about Administration cost but also the entry about Premises and Maintenance.

The UGC has currently a working party investigating the classification of areas of university expenditure.

The categories we include under Central Administration are:

a. Administrative
   - Salaries
   - Advertising
   - Printing, stationery, office equipment
   - Postage
   - Telephone
   - Travel expenses
   - Other expenses [bank charges, audit and legal fees]

b. Maintenance of Pemises
   - Wages
   - Rates
   - Insurance

Rent

Fuel

Gas

Electricity

Water

Repairs

Case studies

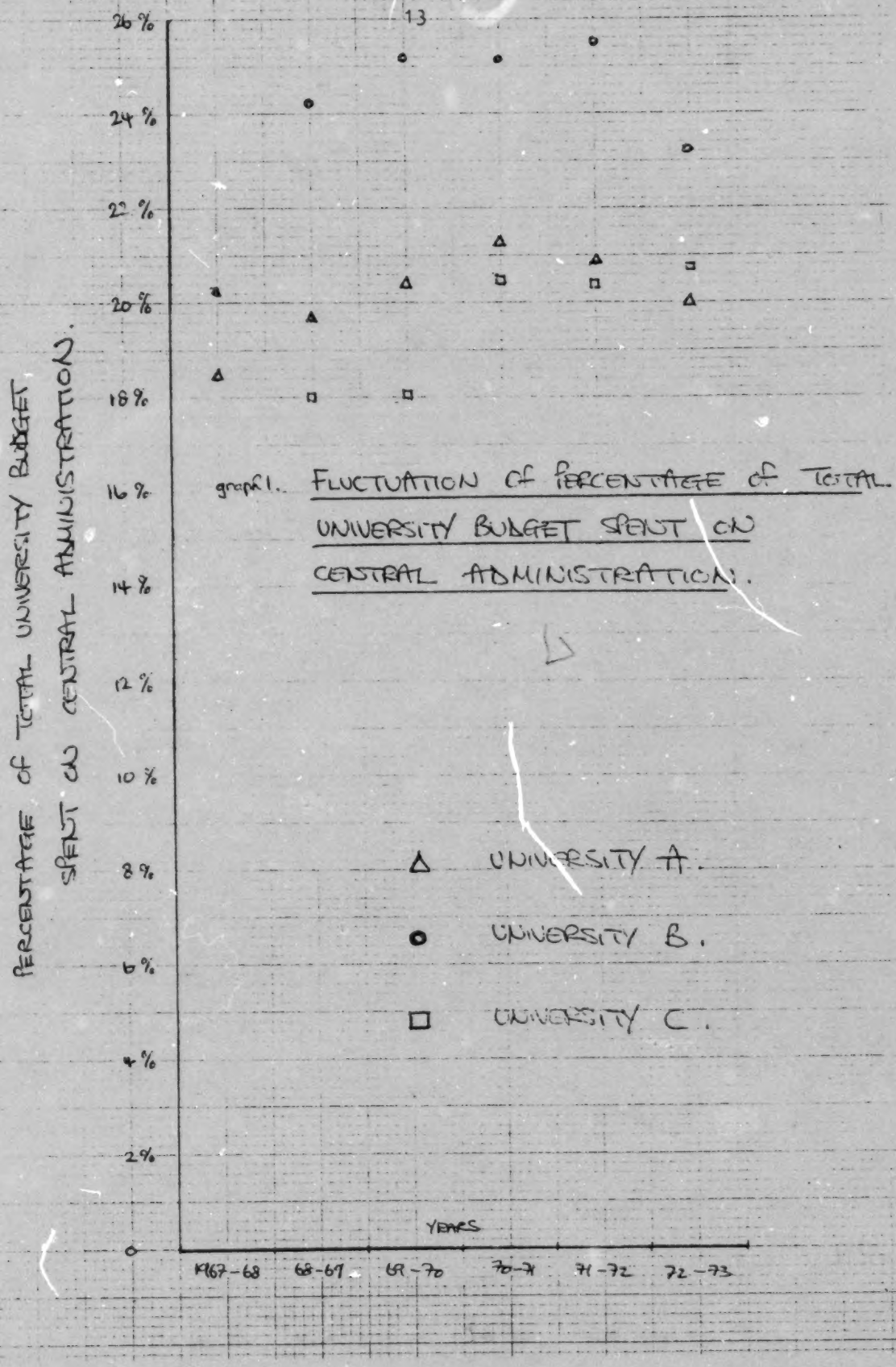
The Central Administrative costs, staff structure and duties of three universities are being examined in detail. No calculations have yet been made on the costs etc of the tasks conducted in the Academic departments.

Linear Growth

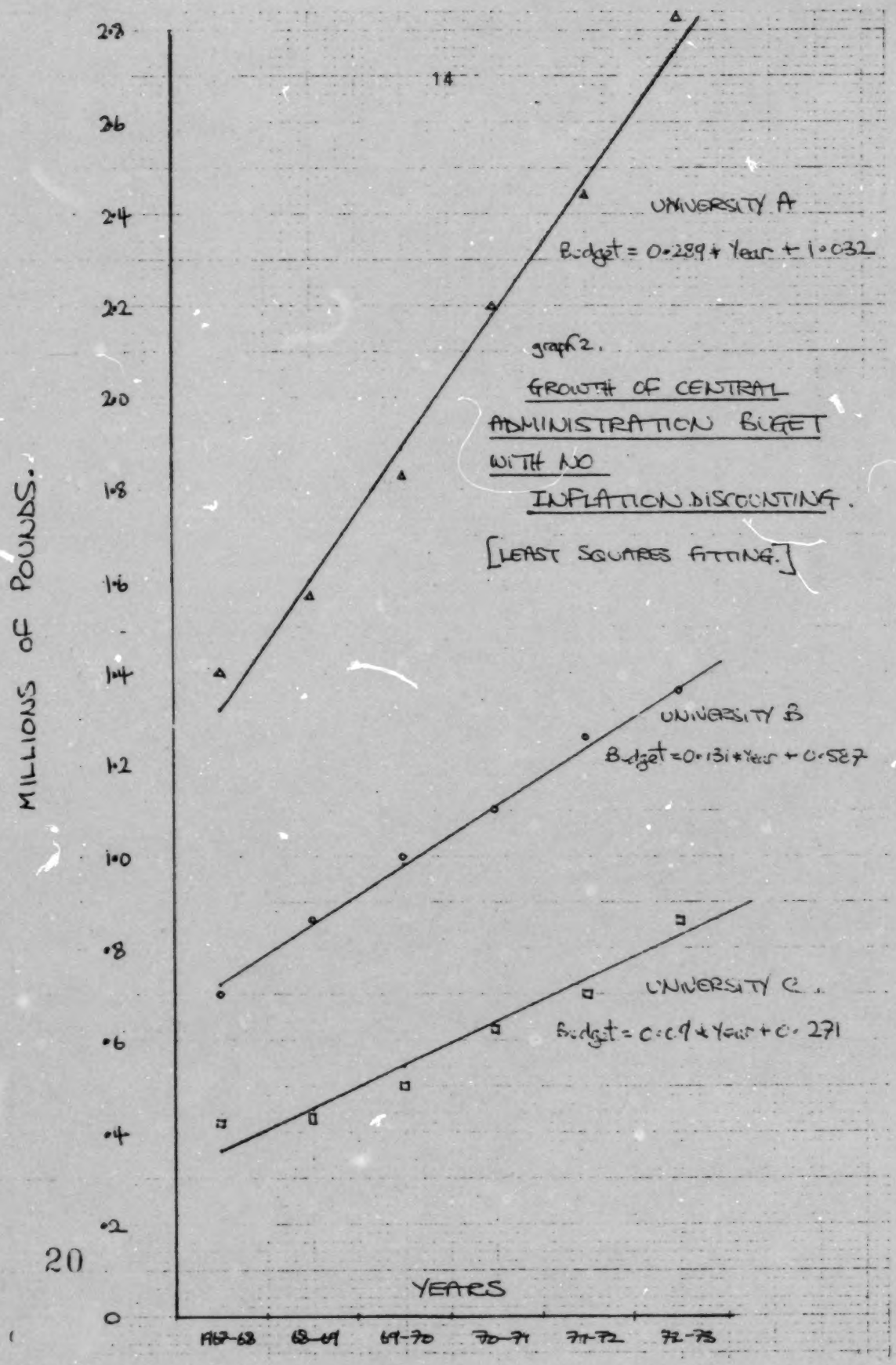
Although the percentage of the total university budget allocated to the Central Administration Fluctuates [see graph 1] the actual amount of cash allocated every year increases almost linearly, [see graph 2] reflecting the last year plus x% style inherent in marginal budgeting.

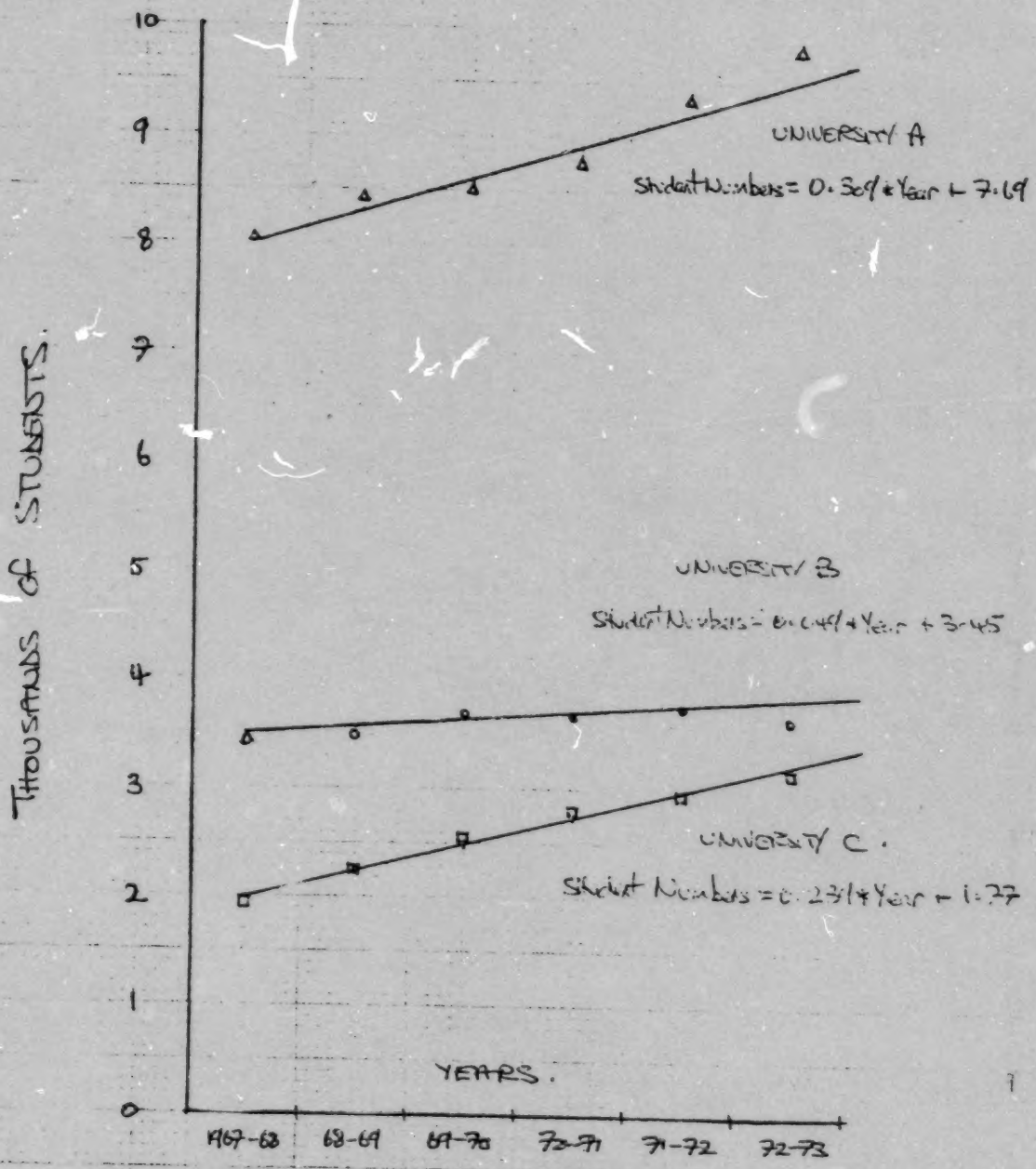
A major variable in the growth of university expenditure is the increase in student numbers. The academic staff numbers are linked by suggested staff/student ratios to the number of students. Graph 3 illustrates the almost linear growth in student numbers at the three universities. The again almost linear, growth of central admin. costs per student for universities A and B are shown in graph 4. We are in the process of discounting these values for inflation.

It is interesting to note that the ratio of the rates of growth of Central Administration and Student Numbers does not correspond more closely for universities B and C.



graph 1. FLUCTUATION of PERCENTAGE of TOTAL UNIVERSITY BUDGET SPENT ON CENTRAL ADMINISTRATION.


2·8
2·6
2·4
2·2
2·0
1·8
1·6
1·4
1·2
1·0
·8
·6
·4
·2
0
MILLIONS OF POUNDS.
14
UNIVERSITY A
Budget = 0·289 * Year + 1·032
graph 2.
GROWTH OF CENTRAL ADMINISTRATION BUDGET WITH NO INFLATION DISCOUNTING.
[LEAST SQUARES FITTING.]
UNIVERSITY B
Budget = 0·131 * Year + 0·587
UNIVERSITY C.
Budget = 0·09 * Year + 0·271
YEARS
67-68
68-69
69-70
70-71
71-72
72-73

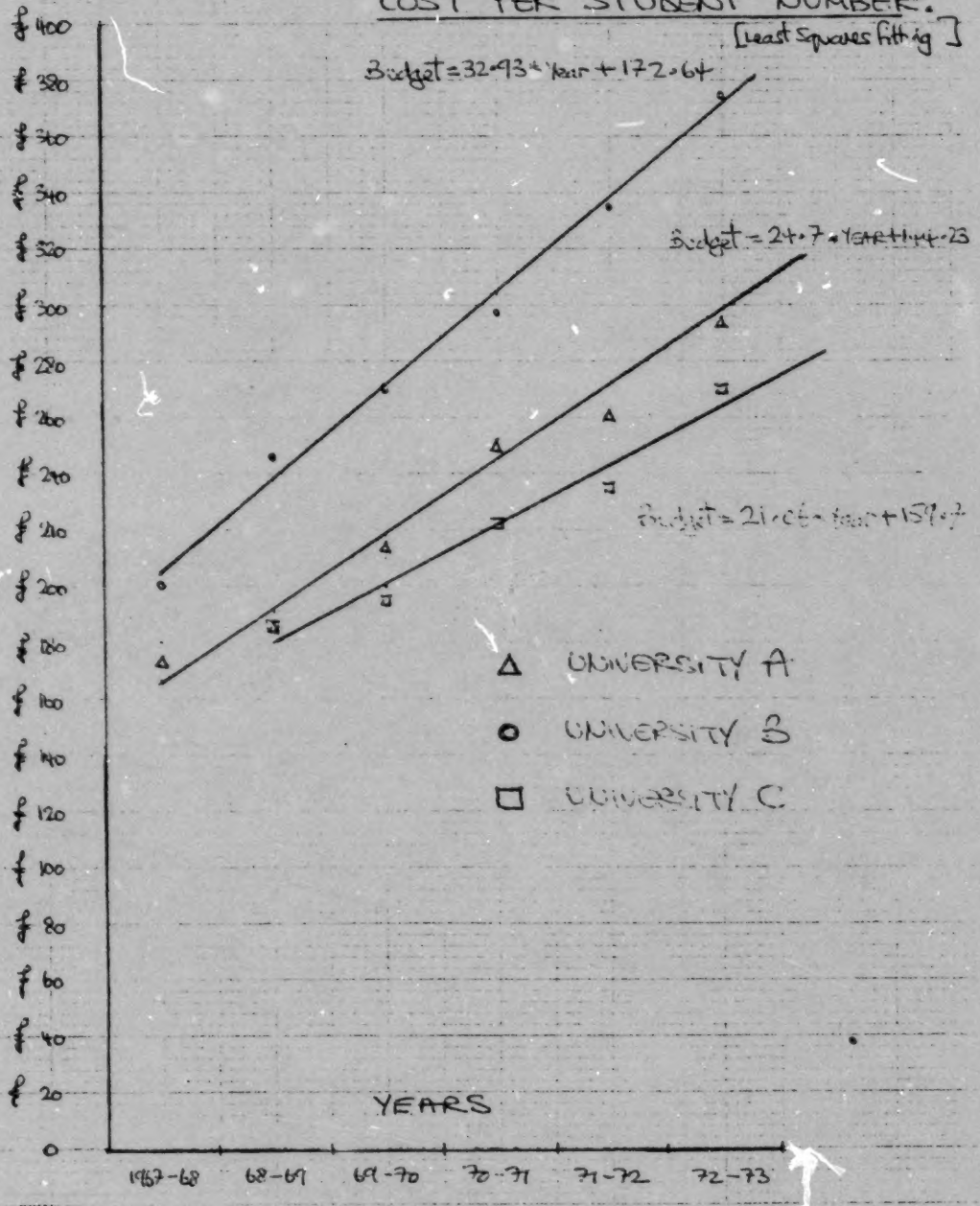


graph 3. GROWTH OF STUDENT NUMBERS.

[LEAST SQUARES FITTING]

graph 4 GROWTH of CENTRAL ADMIN. COST PER STUDENT NUMBER.

[least squares fitting]



Ratio of Central Admin. growth rates	A : B : C
(see least squares of graph 2)	3.2:1.46: 1
Ratio of Student Number growth rates	A : B : C
(see least squares lines of graph 3)	6.31: 1 : 4.88

Future Work

It is planned to study specific administration procedures, student admission, registration etc. to establish what resources each procedure consumes. The exercise of breaking procedures down into the various tasks and subtasks, will focus attention on what tasks are conducted by Central Administration and Academic Departments, with the resources they use.

example:

			RESOURCES:		
Procedure	Task	Subtask	Staff	Equipment	Consumables etc
1. Student Registration	Prepare input cards	Questionnaire to Depts.			
		etc.			
	Process input card				
	etc				

The results of this resource-analysis can be combined with the results of questionnaires on the satisfaction of academic departments with how various subtasks etc are tackled and the expertise of administrators, to suggest possible performance improvements. This work could be related to the findings of Johnson and Palmer at Sussex.

2.3 COMMITTEES

Committee Effectiveness

At some stage resource allocation decisions usually involve some committee activity.

The behaviour of committees provides considerable scope for psychological research. As in the work of Fielden & Lockwood [1] we are very aware that a committee system is often more a political arena in which interest groups bargain, than a bringing together of objective scholars into groups focussed upon analytically solving particular problems.

However, our approach is to quantitatively investigate what resources committees consume and to measure how effectively the committee process performs its activities to the institution, as a decision making function.

Measurements

We are attempting to make explicit the objectives behind a hierarchy of committees and their interactions. To measure the effectiveness of committees we are examining:

a. the terms of reference of committees and the degree university-goals appear to be satisfied at the time, by a decision, through examining key decisions according to their implications on the institution's budget.

b. the appropriate composition of skill, experience etc. for a committee.

c. the relevant information required by a committee.

d. how quickly, accurately and timely decisions are made.

e. work breakdown structure.

f. network analysis.

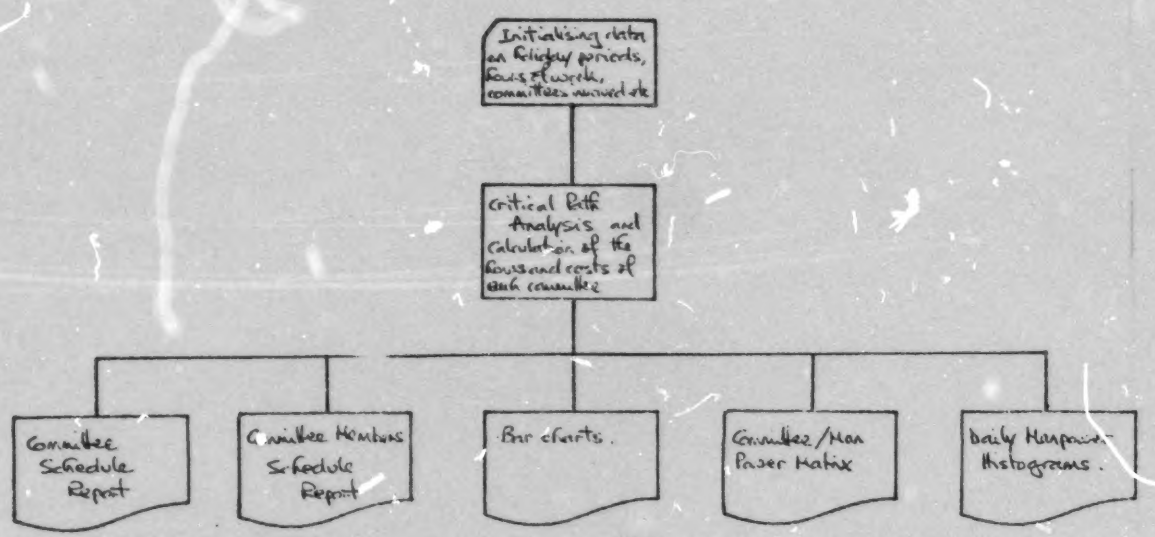
Computer Program

Some results from this study of committee performance are being combined into a computer program that can assist the management of committees.

The timetabling of activities for a given hierarchy of committees is determined by the cycle time of the Council-Senate meetings. Constraints to scheduling the committees that need to be considered are accommodation, common committee members and members timetables of that committee, with the time required by the support activities of preparing agendas, minutes, reports etc.

A computer program 'cTM-V2' that has been written and is currently being improved, uses critical path analysis to assist the scheduling and manpower servicing of a hierarchy of dependent committees.

Simplified Flowchart


Initialising data on holiday periods, hours of work, committees involved etc
Critical Path Analysis and calculation of the hours and costs of each committee
Committee Schedule Report
Committee Members Schedule Report
Bar charts.
Committee/Man Power Matrix
Daily Manpower Histograms.

Initial data on the dependency of the various committees, with estimates of the man hours of work required by each committee, hourly costs of each committee member, length of holiday periods etc. are read by the program and the following reports generated:

1. Committee Schedule Report identifying committees on the critical path and predicted earliest and latest finishing times for every committee, with the amounts of slack, if any.

2. Committee-Members Schedule Reports are generated for each member involved with committee work. The report states what committees he is involved with, their dates and expected duration.

3. The Bar Chart is a graphical representation of activities identifying the periods during which each committee is scheduled.

4. Committee/Manpower matrix. This matrix connects the information from the first two reports.

		Personnel						Total Manhours spent on each Committee.
		1	2	3	4	5	. . .	
Committees	A							
	B							
	C							
	D							
	. . .							
Total Manhours spent on committees by each member								
Total costs of each member								Total cost of all committees.

Each entry in the matrix is the number of man-hours by that member on that committee. Each column is summed to give the total manhours spent by that person on his committee duties. Each row is summed to give the total manhours consumed by that committee. From estimates of the hourly costs of each member's time, the cost to the university of each member is calculated.

5. Manpower Histograms. This report shows the man-power requirement each time period over the cycle and gives the total amount of manpower required for the whole committee structure.

Future Work

Current research is examining more fully the activities of committees to establish a measure of relative priority of decisions according to university objectives.

Desired-attributes-of-members-tables are being generated for each committee, to be matched against personnel files on skills, experience etc. to assist the selection of appropriate experts to committee.

Costs and other implications to servicing the committee process are also being studied. For example: the amount of time spent considering a decision relative to the cost of its resource implications, the length of time a committee is authorised to make decisions on their own initiative, which commit given amounts of the university's resources.

The work of Munch-Andersen[2], on moving decisions between management levels with conflicting objectives, is being extended for resource allocating strategies of a hierarchy of committees.

2. in A. Jensen 'Decision, Planning and Budgeting'[CERI 1972]

2.4. COMPUTING

In the U.K. universities and polytechnics computing is generally treated as a 'free good'. When capacity approaches saturation considerable skill and ingenuity is used to improve the efficient operation of the equipment.

Project selection and resource allocating criteria to improve the effective usage of the computing facilites to the institution, depend on intuitive appreciation of competing project's relative priorities.

Demand-Unit Formula

Funds to purchase academic computing facilities for universities come from the Government Computer Board. Although computing power is not apportioned to universities in exact proportion to their population, a comparison using the "Demand Unit" is made.

The formula to calculate the Demand Unit now in use is:

$$1000\ DU = (AUG + 20 + APG + AS) + 5\ (SUG + 20 + SPG + SS)$$

where AUG (SUG) is the total of arts (science) undergraduates.
APG (SS) is the total of arts (science) postgraduates.
and AS (SS) is the total of arts (science) staff

The weighting factors of 20 and 5 were obtained from the usage statistics collected from a number of universities.

It must be emphasised that the Board only uses the Demand Unit as a guide. Other factors are taken into account when considering university computing requirements:

(a) Third shift on the existing machine sponsored by university and shown to be saturated

(b) Regional facilities used but inadequate

(c) Cost consistent with a reasonable level of expenditure for that university

(d) Approximately 1 RJE station to every Atlas unit.

(e) Approximately 4 teletypes to every 1000 students

(f) Well supported claims for the computing requirements of planned teaching and research projects.

An increase in the computing provision cannot be justified solely on the grounds that the university is now using all available computing resources and the users want more.

§ 2. University satisfaction factor

At a university with 'd' demand units and computer power capacity of 'a' units there is a satisfaction factor of a/d (computer power/demand units).

The satisfaction factors of computing power per demand unit, at the various universities in 1970-71, form the following league table in figure 1.

A tentative connection between a universities satisfaction factor and its research output can be show by comparing a university's position in Fig. 1 and Fig. 2, which classifies universities by their graduate student numbers in 1969 and the average of their financial grants awarded in 1967 - 1969. Institutions with a low computing satisfaction rating are also generally low on research output. However, institutions with a high computer satisfaction are not always high on research output.

24

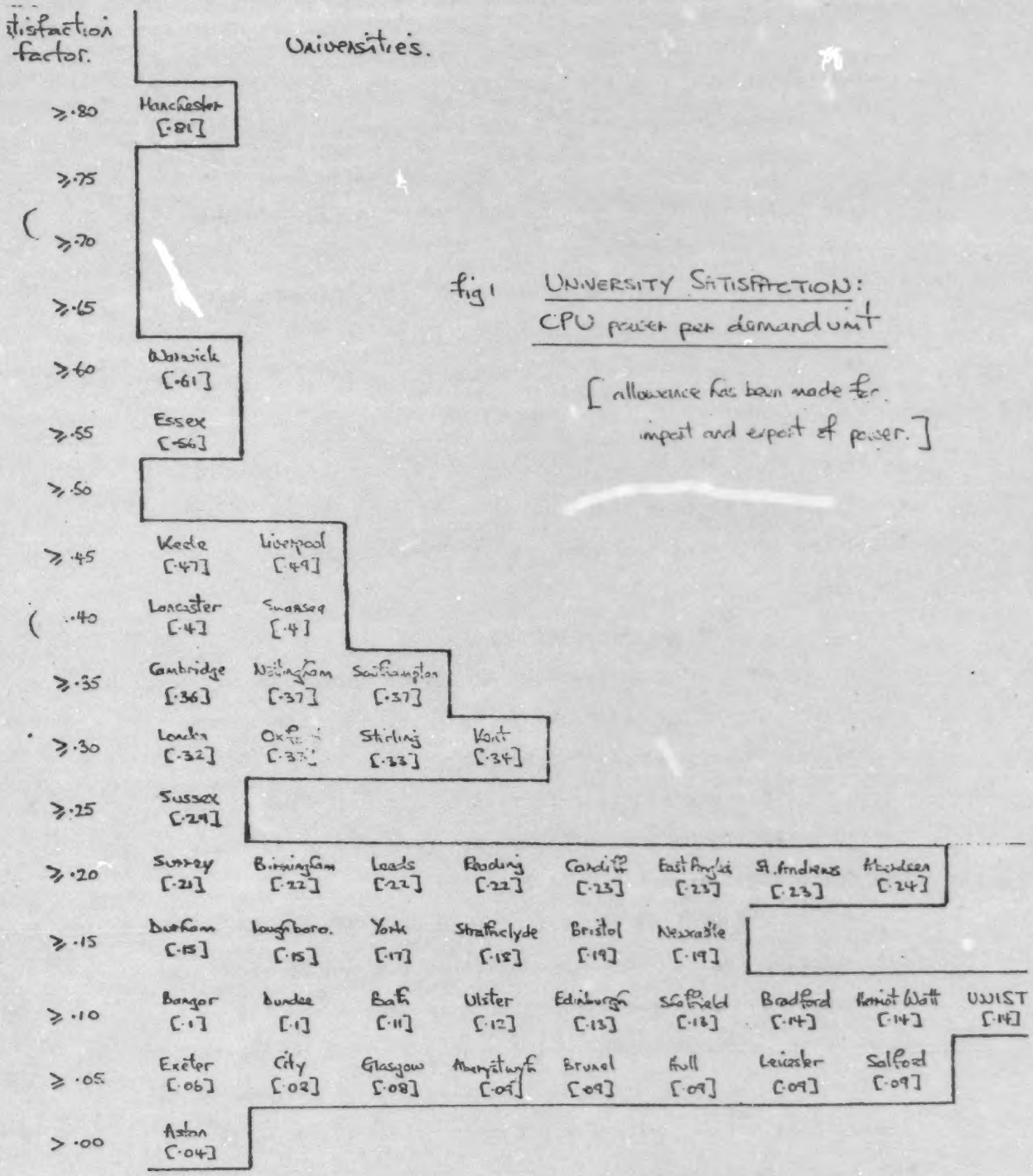


fig 1 UNIVERSITY SATISFACTION:
CPU power per demand unit

[allowance has been made for import and export of power.]

FIG 2

Research Grants	Graduate Students	Colleges/Universities
(relative to university income)	(relative to all full-time students)	
Large	Large	Birmingham, Cambridge, Chelsea, Essex, Imperial, L.S.E., Oxford, Queen Elizabet, University Col (London), Sussex
Medium	Large	UMIST, Warwick, Bedford, King's
Large	Medium	Southampton, York, Bristol, Edinburgh, Newcastle
Medium	Medium	Bangor, Cardiff, Durham, East Anglia, Kent, Lancaster, Leeds, Leicester, Liverpool, Loughborough, Manchester, Queen Mary, Reading, R.H.C., Sheffield, Strathclyde, Swansea, Westfield
Small	Medium	Aston, Bradford, Salford, Aberystwyth
Medium	Small	Glasgow, Keele, Aberdeen, Bath
Small	Small	Brunel, City, Dundee, Exeter, Heriot-Watt, Hull, St. Andrews, Stirling, UMIST

For further details see:

E. Rudd 'Higher Education, Vol. 2. No. 3. April 1973, p.301-324.

Increase in Demand

Computing is of increasing importance to the research missions, administrative tasks , library procedures and management decision making of the university. Computing facilities are enabling undergraduate teaching in the Sciences, Engineering, Geography and Quantitative Management etc. to tackle far more realistic but complex problems, problems that were research topics of only a few years ago.

This growing sophistication of the usage of computing, with the UGC request for increased student exposure to computers and its potential through CAI, places greater demands on the resources of the Computer Centre than can be met by the maximum of 10% of the total university budget proposed by the Imperial College Study. (Imperial College internal paper 11th DEC 1972). The existing Demand Unit formula is also to crude a calculation to assist effective decision making.

Resource Allocation as Investment Portfolio

The Computer Service is responsible for providing computing facilities to assist the university missions and decision making activities. Much more is involved here than just an efficient computer operation. In essence, the university management is to invest computing resources in various missions.

The output from these missions in the form of degrees, publications, etc., are some measure of the return on the investment. The management's responsibility is

to build a balanced portfolio within its qualitiative objectives, that attempts to maximise this return.

As in financial portfolio management, the time dimension of the returns of various missions is important. Some pay back rapidly, others more slowly. Also, each bears a certain level of risk; some will not pay back as expected, and others will incur unexpected losses.

Identifying the needs for computing in the institution, judging feasibility and trading off missions until a high performance portfolio is formed is not a simple procedure, particularly as the output measures are not readily quantifiable.

It is important that the university as an institution understand the process of perceiving and appreciating the possible returns on its computer resource investment, given the current environment and computing experience. Techniques of financial management can provide methods for considering computing resource allocation as an investment.

Explicit Information

Perception and appreciation of:

a) computing needs

b) implications to other mission's requests for service

c) university objectives for the outputs of the Academic departments (and the Registry, Bursary and Library)

can be assisted by explicit information.

The nature and significance of items of information gain clarity by attempts to make them explicit. Agreement or at least understanding, of the results of decision making is achieved when adequate consideration of relevant data occurs and is seen to occur.

Factors contributing to decisions on, the amount of computing resources to allocate and priority relative to other tasks, are to be based on:

a) an assessment of the importance of the results of the mission assisted by computing, to institution wide objectives.

b) an estimate of the importance of computing to the mission.

c) explicit requests for the quantity and quality of computing required
i.e. broken down into a profile of:

(i) CPU requirement
(ii) main memory
(iii) bulk storage
(iv) turnround time
(v) data prep
(vi) programming support and advice
(vii) expendables, like stationery
(viii) special equipment like modems etc. etc.

d) personal commitment on the part of the user to

computerizing his task. Administrations do not have an explicit n year plan formulated, so that each job is an ad-hoc file generator and coding task without any overall MIS principles guiding implementation.

These factors need to be supported by quantitative information.

The managing of university computing currently relies to a great extent of intuitive judgement based on implicit interpretations of objectives. There is no regular use of methods for procuring or weighting quantitative data, to assist decision making on factors a and b.

Factor 'a' - the assessment of university objectives for a mission, can be assisted by the quantitative method suggested in the Centre for Computer Studies report 28. Where a numerical rating of objectives is derived from experts using the interactive Delphi process. The mission-output goals, that measure progress towards reaching objectives, are being established, with supporting satisfaction criteria.

Factor 'b' - an estimate of the importance of computing to the mission, involves the judgement of the user and his mission sponsors. They need a commonly understood measure to compare computer benefits with benefits derived from other sources, and information on the relative needs of competing missions.

Future Work

Clearly there can be no one 'best allocating strategy' resulting from this combination, since they are dependent upon the changing content of university projects, the appropriateness of the quantiative evidence and the abilities of the experts chosen.

Our continuing study of the requirements for explicit information will enable us to produce performance criteria that assist 1) the building of high performance portfolios and 2) periodic reviews of goals and resource allotments.

2.5 LIBRARY

Literature Review

The first stage of the project was to carry out an extensive literature review to assess the state of the art. Libraries seem to have been the subject of much study in the last decade, but these studies have mainly been concerned with making library service efficient. We are concerned with the effectiveness of resource allocations to the library and subsequently the allocation in quantity and quality to the academic departments to meet priorities in teaching and research.

Postal Survey

The response to a postal survey has been very poor and of varying usefulness. From an examination of the few replies received it would appear that resource allocation methods are mainly implicit rather than explicit. The methods that do exist and can be quantified are based on student numbers. Most methods, however, are a matter of bargaining for what is left after budgeting to cover last year's commitment.

A recurrent point raised by many respondents is that of a severe and increasing shortage of funds. The Parry Report (1967) recommended a 6% allocation of total university expenditure to libraries, thereby fixing a library's role forever in a dynamic system. University returns appear to be still around that mark, but polytechnics are nearer 4.5%.

In both cases, however, it seems that the amount allotted to the library is nowhere near sufficient to finance the bookfund adequately, according to the library's criteria. One of the major causes is the escalation of academic book prices over the last few years.

As a result of this dilemma, it is apparent that there is an increasing awareness of, and interest in the problems of resource allocation, according to the university as a whole, criteria.

In only a very few of the replies was there any indication of a consideration of resource allocation as an aid to achieving institutional objectives. The most interesting of these replies was from City of London Polytechnic considering the library as an industrial firm. Others were certainly aware of the problem, but either did not see the point or had not the time to research the area further.

Perhaps Liverpool Polytechnic's was the most realistic in describing the allocation methods as on a 'competitive/consultant basis' for a 'slice of the cake'. It is in this process of bargaining that there is often a glimmer of an implicit set of standards adhered to for allocation purposes, but seldom is this made explicit.

This bargaining process is usually carried through a chain of formal committees, varying in length and composition. It is not clear, at this stage, how representative of the users true need is demand measured by requests at the library itself. For instance, if over a period of time it becomes apparent that the library collection is deficient then alternative ways of obtaining information will be sought and demand will either remain static or decrease. Whether this is a desirable reaction is open to debate.

Future Work

It is evident that there is much scope for investigation in this area of resource allocation using explicit institutional priorities for teaching and research. There are, however, certain inbuilt resistances to any attempt to formalize hitherto informal implicit methods.

It is proposed to collect data on the library resources currently available with estimates of areas of growth. The usage and potential usage of the library resources by academic department will then be examined to relate quantity and quality of resources available and departmental needs.

2.6. STUDENT WELFARE

Introduction

Student Welfare Services cover a wide range of provision difficult to examine as a cohesive unit. The Services of Counselling and educational/vocational guidance are being studied.

From a postal survey of polytechnics and of universities, and visits to some institutions of both types, there is no evidence to suggest that any institution of higher education makes a systematic attempt to analyse the effectiveness of resource allotments to their Student Welfare Services, although some 'consumer feedback' is carried out in the longer established university sector.

Not surprisingly in these circumstances the topic appears to them at best controversial, certainly experimental and to many a threat to their integrity and organisation. This applies particularly to health service units, who tend to find it all too easy to retreat behind their professional training and medical confidentiality and suggest that anyone lacking medical training is unsuited to the task of examining their work, to see if resources are used to meet institutional priorities for student welfare. As a result, health provision has had to be omitted from detailed study.

Survey of Polytechnic Careers Service Provision

There is an institutionally based careers service

in 29 polytechnics so far, in a few cases provided by the local authority careers service direct. In 2 of these cases the careers officer is only involved part-time in careers duties and in one other case degree students are currently seen by the local university careers service. In most cases there is, of course, co-operation between polytechnic and university careers services in the same locality and most Polytechnics are in full or partial membership of the Standing Conference of University Appointments Services. This is enhanced by the regular receipt of information and other help through the Central Services Unit based in Manchester.

The majority of careers staff are single-handed. If we take all existing professional careers staff in Polytechnics there are the equivalent of 40 full-time people in post or about to take up posts. Nine Polytechnics have more than one careers adviser. In a number of cases the careers staff also handle school liaison work. In nine cases there is an information assistant in the service. All careers advisers have either an information officer or at least a part-time secretary, and in four cases they have both. One service also has an administrative assistant and a receptionist.

In those cases where there is an overall Advisory Service (five Polytechnics) and in others where different parts of guidance and welfare services co-operate, there may be some sharing of staff with student counsellors, chaplains,

nurses, etc., which may mean there are reception and similar staff common to the Service as a whole.

The provision made for a careers service does not relate to the student population. Polytechnics with 4,000 full-time students and with 1,500 have 1 careers adviser. One Polytechnic with 4,000 has no provision; another with 3,000 has 2 careers advisers and 3 ancillary staff. Nor is there necessarily any connection between the length of time the Polytechnic has been designated and the existence or other wise of professional careers counselling; the length of time for which existing Services have operated varies from four years to one. Salaries levels are also variable and not all are classified as academic posts. The salary does not relate to the size of the service or the institution.

Services seem to be responsible to someone at Deputy Director level or similar, although in advisory service units this is through a head of the unit. Control of day-to-day activities is minimal. In only four cases is there anything approaching the 'Appointments Board' normal in the University setting. Most careers officers report (anything from 'weekly' to 'occasionally') to their superiors and inevitably they work within budgetary limits. No one is on their Academic Board, but there is some evidence of influence at Faculty level.

The budgetary situation is confused and amounts spent on careers services vary widely. In some cases there is no budget. Our questions did not enable us to clarify

where charges such as telephones or printing and stationery were made against central rather than departmental budgets. It is also difficult to sort out in a student services situation what proportion of the budget is allocated to careers work.

The general picture of what is provided is similar everywhere: individual counselling; careers talks; information sheets and vacancy lists. Figures suggest something like 25% of the students are in contact with Services. It is difficult to make inter-institution comparisons, or even polytechnic university comparisons, without looking closely at the final year student composition, in particular the proportion of students sponsored and the number of directly vocational courses.

Only a quarter of services specifically claim to assist discontinuing students. A similar proportion have infiltrated departmental timetables in order to talk to students.

Over two thirds are involved in training placements, school liaison, or other 'fringe' activities.

Between 1 - 20% of time is spent on visiting and employer contacts. Only four services do not have employers visiting campus for recruitment purposes. Most polytechnics have departments individually engaged in the same pursuit.

Services have the bare minimum of typewriters and telephones and depend on central provision for whatever else is needed, although most now sport a PER unit (and most

n 1974 are partaking the Computer Assistant Placement Service. Five services appear to be without information rooms and in one other case the information section is in the main library. No one appears to be without a room suitable for counselling, but in a few cases it is shared.

This survey was undertaken some months ago in the most rapidly developing sector of higher education. Polytechnic services are rapidly reaching comparability with university appointments boards, which have also been surveyed in some detail. Details are also available on personal counselling provision in polytechnics and universities, but the general conclusion of the second paragraph of the introduction still prevails.

Problems of Research into Guidance and Counselling

1. Value judgements (political, personal, etc). will continue to be part of evaluation.
2. Counselling is currently in demand despite lack of evidence as to effectiveness/efficiency of particular procedures or outcomes.
3. In a situation where a service is commited to helping clients, it is difficult to isolate a control group against which to judge those undergoing certain guidance/ counselling procedures.
4. In interpersonal relationships it is difficult to allow for variables in the counsellor and the client, the effect of outside agencies during the period of counselling and the possibility of 'spontaneous remission' of the problem presented.

5. There is confusion between the process of counselling and outcomes of it. Immediate interest may lie in the latter. Resources are being used in the former and therefore the relationship of the two is important. Saying a counsellor works on the Rogerian client-centred therapy pattern does not tell us what actually happens in a particular interaction with a client or even how this counsellor normally performs
6. There is confusion about, or absence of, goals in counselling. For whom are the goals decided if there are any declared? Over what period of time are they existing? obviously broad aims like adjustment to a culture are not sufficient. Goals must be measurable, but not trivial. Goals may be decided for a particular client in consultation with the counsellor, and research into either process or outcome may require to be done on an individual case-study basis. The researcher must anyway be able to formulate expected results clearly so as to choose definitive, relevant and measurable factors inside and outside the work situation to analyse. The basic question is - what kinds of counsellor activity produce what kinds of change in what kinds of client?
7. Pre-test may sensitise clients to treatment and confound the outcome measures.
8. Counsellor may be unwilling to proceed in way necessary for research (e.g. record-keeping, observation, analysis of tapes, follow-up of clients). Danger of self-report procedures.

9. Clients may over-dramatise problems and equally over-report benefits of counselling.
10. Frame of reference of client may change during long term research.
11. Replication of counselling situations impossible.
12. Multiplicity of variables may require multivariate research design (e.g. mixture of pre- and post-testing with counselling and control groups).
13. Longitudinal studies are required to identify complete or final as opposed to intermediate outcomes. More extraneous factors enter as time interval lengthens.
14. Self-selection for counselling procedures and pre conceptions about counselling bias research samples.
15. Research may conflict with principles of confidentiality and priviledged communication (see 8 above).

Future Work

It is intended that further visits be made to institutions who have attemped work in this field (notably Sussex and Loughborough Universities). This will enable the writer to firm up his proposals for a resource/performance methodology.

3. BIBLIOGRAPHY OF DES PROJECT PAPERS TO DATE

Student Services: Roger Crowther (Huddersfield Poly)

DES Report No.		Title	Date
1.1		Project on resource allocation and performance indices in Central Student Services: proposals for the development of this section of the project.	Nov. '73
1.2		Guidance, counselling and welfare services in Higher Education.	Dec. '73
1.2	Appendix I	Survey of polytechnic careers service provision preliminary report.	April '74
	Appendix II	University careers service tables of staff, budget, space, equipment and student numbers.	April '74
	Appendix III	Polytechnic careers service tables of provision	April '74
1.3		Report on 'Advancement of Counselling' Conference: Cambridge	April '74
1.4		Student advisory services in polytechnics.	May '74
1.5		Counselling and medical services in English universities.	May '74
1.6		Problems of research into guidance and counselling	June '74
1.7		Report on Research into Student Services (in preparation)	Nov. '74

Computing Services: Graeme Norris (University of Leeds)

DES Report No.	Title	Date
2.1	UGC grants	June '73
2.2	Cost accounting.	July '73
2.3	Allocation and pricing	August '73
2.4	Collecting information from the computing services	Sept. '73
2.5	Computing resource allocation and performance criteria: state of the art.	Nov. '73
2.6	Networking	Dec. '73
2.7	Project methodology and developments in university computing	Dec. '73
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4.2	Resource allocation in the Libraries of universities and polytechnics.	March '74
4.3	Preliminary report on academic libraries in the UK.	Nov. '74

Administration: Gabrielle Garthwaite (University of Leeds)

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5.2	Institutional management in Higher Education: a preliminary report.	Feb. '74
5.3	On the admin. subproject	March '74
5.4	A case study of the Leeds Central Administration	June '74
5.5	On some ways of representing expenditure	Oct. '74
5.6	Extracts from a preliminary report on some universities	Oct. '74
5.7	Pilot study report on administration in some universities.	Oct. '74

General Papers:

1.	(No. 29)	Investigation into the application of quantitative analysis to university management. (Kenneth Smith)	Feb. '72
2.	(Proposal)	Resource Allocation Formulae and Performance Indices in Central Services of Universities and Polytechnics. (Kenneth Smith)	June '73
3.	(No. 35)	Student Prediction Model (J. Allardyce)	April '74
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